

Vocera WLAN Requirements and Best Practices

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Last modified: 2025-02-25 08:47

ED-Solution-VIG-Docs build 83

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WLAN Requirements and Best Practices

This document summarizes the required settings and best practices for Vocera system implementations.

You can find more detailed information in the [Vocera Infrastructure Planning Guide](https://pubs.vocera.com/solution/vig/production/help/vig_vig_help/index.html), available for download at: https://pubs.vocera.com/solution/vig/production/help/vig_vig_help/index.html



Note: This document is not comprehensive and applies to the setting recommendations for Vocera only.

Common WLAN Settings

Universal WLAN settings and best practices that apply to all WLAN vendor equipment are listed in this topic.

The following table displays the required common WLAN settings.



Setting	Recommended Value
Authentication Timeouts	Add session timeout of at least 1 full shift
AP Transmit Power	<ul style="list-style-type: none">• Max 17 dBm (50 mW)• Min 12 dBm (16 mW)
Band	5GHz
Band Steering	Disable
Basic Data Rate	Data Rates Determine the rate as needed for each site
Beacon Interval	100 (Required)
Channel Plan	2.4 GHz—1, 6, 11 5 GHz—Any Note: <ul style="list-style-type: none">• Vocera does not recommend using channels 120-128.• B3000n does not support channel 144.• If utilizing DFS channels, do not hide the SSID to speed up roaming.

Setting	Recommended Value
Channel Width	<p>For optimal channel separation and to minimize co-channel interference Vocera recommends 20 MHz wide channels.</p> <p>B3000n Badge:</p> <ul style="list-style-type: none"> • 2.4GHz—20 MHz • 5 GHz—20MHz or 40MHz <p>V5000 Smartbadge</p> <ul style="list-style-type: none"> • 5 GHz—20MHz, 40MHz, or 80MHz <p>C1000 Minibadge</p> <ul style="list-style-type: none"> • 5 GHz—20MHz, 40MHz, or 80MHz
Client Exclusions	Disable
Coverage	<p>-65dBm Minimum (Recommended: 2 Access Points with -65dBm)</p> <p>Vocera Badges require a sensitivity level of -65dBm, as measured from a mobile VoIP client. You should apply the recommended mobile VoIP offsets from a survey vendor of your choice. For instance, consider applying the RSSI offset from Ekahau.</p> <p>Stryker's internal testing has identified the following signal offsets when using the Ekahau Sidekick for data capture with Vocera devices.</p> <ul style="list-style-type: none"> • -8 dB for 5 GHz • -5 dB for 2.4 GHz <p>Stryker provides specific offsets for Stryker devices only. For device offsets for non-Stryker devices, refer to the respective device manufacturer's wireless specifications.</p>
DTIM	1 (Required)
Load Balancing	Disable
Max Number of SSIDs	5
Minimum SNR	+ 25 dB
Neighbor Reports (802.11k)	Enable
Priority Queue	Highest—Voice (Required)
Roaming Policy	<ul style="list-style-type: none"> • B3000n—2 • V5000—3 • C1000—3
Voice Grade Site Survey	Recommended
WMM	Recommended

The following table displays the multicast recommendations.


Setting	Recommended Value
Multicast Configuration	<ul style="list-style-type: none"> • PIM (Sparse Mode or Sparse Dense Mode) must be applied to all Vocera VLANs and the WLC management VLAN. • Enable IGMP Snooping on APs and all L2 devices in the multicast audio path. • Block all unnecessary multicast traffic.


The following table displays the association delays caused by authentication.

Authentication Type	Association Delay	Comments
EAP-FAST	200 ms	Frequent session timeouts can result in additional delays.  Note: For EAP-FAST, use CCKM (only for B3000n), OKC, or 802.11r to cache credentials and optimize roaming times.
PEAP EAP-TLS	Varies	The association delay caused by authentication varies based on the cipher strength (1024 bit or 2048 bit) and the depth of certificate chains.  Note: For EAP-TLS and PEAP, use CCKM (only for B3000n), OKC, or 802.11r to cache credentials and optimize roaming times.
PSK	< 100 ms	PSK often provides the optimal trade-off between security and performance.
Encryption	NA	AES-CCMP. Vocera badges do not support WEP, TKIP or SAE.

Cisco Networks

Vendor specific WLAN settings and best practices that apply to the Cisco networks equipment are listed in this topic.

Setting	Recommended Value
Admission Control (ACM)	Disable
AP Multicast Mode	Multicast (239.x.x.x)
Auto QoS (IOS-XE only)	None
Band Select	Disable
Coverage Hole	Disable If Coverage Hole Detection is necessary, enable it with the following settings: <ul style="list-style-type: none"> Set Voice RSSI (-60 to -90 dBm) to -70 Set Min Failed Client Count per AP to 12
DHCP Address Assignment (required setting)	Disable
Flex Connect	Centralized Mode or Distributed mode.  Note: For Vocera voice this option is not recommended. If you have a need to enable this option, contact Vocera Technical Support.
Load Balancing	Disable
Rogue Location Discovery Protocol (RLDP)	Disable
RRM—Dynamic Channel Assignment	Interval should be more than 8 hours. It is the typical duration of one nursing shift.
RRM—Dynamic Transmit Power Control	Enable if the maximum and minimum transmit power levels meets Vocera's recommended settings.

Setting	Recommended Value
Multicast Mode#Global	Enable Disable Mobility Multicast Messaging if multicast is not properly enable in network. It causes one-way audio or no audio.
Multicast Tx Data Rate	Highest data rate. 12Mbps and 24Mbps as mandatory data rates.  Note: Vocera highly recommends to disable DSSS/11b rates (1,2,5.5, 11) on the AP.
Optimized Roaming	Disable
RSSI Low Check	Disable
Symmetric Mobility Tunneling	Enable
Transmit Power Threshold	Adjust to fit site
U-APSD	Enable
Unicast-ARP	Disable
WLAN QoS	Platinum
WMM	Optional

Cisco Networks with Apple Smart Devices

Vendor specific WLAN settings and best practices that apply to the Cisco Networks and Apple smart devices are listed in this topic.

Settings	Recommended Values
iPhone iOS version	10 or later
Band	5GHz
WLAN QoS	Platinum
Fastlane	Enable
Wireless Security	WPA2/AES - PSK
Fast Transition (802.11r)	<ul style="list-style-type: none"> • If using PSK - Set FT to Adaptive • If using 802.11X authentication - set FT to Enable • FT- OTA (over the air) must be used
Assisted Roaming (802.11k)	Enable (5GHz - single band)
BSS Transition Management (802.11v)	Enable
WMM	Optional
Band Select	Disable
Load Balancing	Disable
Voice CAC	Disable
EDCA Profile	Fastlane
RSSI Low Check	Disable
Optimized Roaming	Disable
Global Multicast Mode	Enable
AP Multicast	Multicast (239.x.x.x)

Settings	Recommended Values
IGMP Snooping	Enable
RLCP (Rogue Location Discovery Protocol)	Disable

Aruba Networks

Vendor specific WLAN settings and best practices that apply to the Aruba access points are listed in this topic.

Settings	Recommended Value
ARM	Enable if honoring maximum and minimum transmit power levels.
Dynamic Multicast Optimization	Enable
Dynamic Multicast Optimization Threshold	30
IGMP Proxy	Enable on Vocera VLAN(s)
Mcast-rate-opt (needed for multicast to go at highest rate)	Enable
Multicast Filters—Use the Aruba Policy Enforcement Firewall (PEF) to configure these multicast filters to block traffic.	netdestination HSRP Host 224.0.0.2 netdestination VRRP host 224.0.0.18 netdestination RIP host 224.0.0.9 netdestination OSPF host 224.0.0.5 host 224.0.0.6 netdestination PIM host 224.0.0.13 netdestination EIGRP host 224.0.0.10
Probe Retry	Disable
Role	Voice
Session ACL	vocera-acl
Tx Data Rates	2.4 GHz—6, 9, 11, 12, 18, 24 5 GHz—Data rates change depending on the site
Voice Aware Scanning	Enable

Extreme Networks

Vendor specific WLAN settings and best practices that apply to the Extreme Networks - Extreme Cloud Appliance are listed in this topic.

Setting	Recommended Value
Admission Control	Disabled (Default)
DTIM	1 To support multicast group calls
Radio Management (11k) support	Enable

Setting	Recommended Value
Radio Share Mode	Off
Multicast Bridging	Enable
Multicast Rule	VLAN Predefined Multicast Rule Vocera Mcst added to rule list.
Minimum Basic Rate (MBR)	Based on Site Survey MIN 12

Meraki Networks


Vendor specific WLAN settings and best practices that apply to the Meraki Networks access points are listed in this topic.

Setting	Recommended Value
Wireless	
WPA encryption mode	WPA2
802.11w	Disable
Splash page	None
Assign group policies by device type	Disable
VLAN tagging	Use VLAN tagging
Content filtering	Don't filter content
Bonjour forwarding	Disable Bonjour Forwarding
Mandatory DHCP	Disable
Band selection	Do not use Dual band operation with Band Steering
RF Profile	
Client balancing	Off
Switch	
Multicast routing	Enable IGMP snooping querier
Quality of service	DSCP 46

Fortinet/Meru Networks


Vendor specific WLAN settings and best practices that apply to the Meru Networks/Fortinet are listed in this topic.

Setting	Recommended Value
Badge Roaming Policy	1
IGMP Snooping	Enable
Multicast setting	Configure UDP Broadcast Port 5555 for Badge Discovery for Meru.
QoS Rules	Enable QoS Rules 7 and 8. It is enabled by default. Separate for Vocera
SSID	Separate for Vocera

Setting	Recommended Value
Virtual Port	Disable  Note: Vocera recommends that you do not use Virtual Port.
Virtual Cell ¹	Enable only if no native cell option
Vocera Location Feature	Disable Virtual Cell or divide APs into zone.

Ruckus Networks

Vendor specific WLAN settings and best practices that apply to the Ruckus access points are listed in this topic.

Setting	Recommended Value
Authentication/Encryption	WPA2/AES (802.11i)
Band steering, load balancing	Disable
Controller Code	Latest from Ruckus
Directed-Multicast and Broadcast	Turn off conversion of broadcast and multicast to unicast on the WLAN interface using the following commands: <ul style="list-style-type: none"> • ruckus(config-wlan) # no qos directed-multicast • ruckus(config-wlan) # qos directed-threshold 0  Note: Both the commands are required. Issuing only the first command causes audio issues during Vocera Broadcasts.
DHCP	Enable
Hiding SSID in Beacons	Not recommended
Inactivity Timeout	720 (12 hrs)
Mesh	Disable
Minimum BSS Rate	Depends on AP density
Power Level	2.4 GHz—25 mW 5 GHz—50 mW
Proxy ARP and ARP Broadcast Filter	Enable
Smart-Roam	Disable
VLAN	Dedicated non-native VLAN
Wireless Client Isolation	Disable
WLAN Background Scanning	Disable

¹ A Transmit Power Asymmetry problem may arise at the edges of Virtual Cell coverage if the transmit power of an AP is higher than the Vocera device (~30mW). To avoid poor audio at the edges of the Virtual Cell, the RSSI of the Vocera device on the AP must be verified. The Vocera device should never drop below an RSSI of -75dBm.